

REMARKS

These remarks and the above amendments are responsive to the final Office action dated October 5, 2005. Claims 54-56 and 58-77 were previously pending in the application. The Office action can be summarized as follows:

- Claim 75 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
- Claims 54-56 and 58-66 were rejected as being unpatentable over U.S. Patent No. 4,672,040 to Josephson ("Josephson") in view of U.S. Patent No. 5,855,790 to Bradbury et al. ("Bradbury").
- Claims 54-56 and 58-66 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Josephson in view of U.S. Patent No. 5,328,681 to Kito et al. ("Kito").
- Claims 54-56, 58-69 and 74-76 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Josephson in view of U.S. Patent No. 6,417,011 to Miltenyi ("Miltenyi").
- Claims 70-72 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Josephson and Miltenyi in view of U.S. Patent No. 4,048,298 to Niswender ("Niswender").
- Claim 73 was objected to as being dependent upon a rejected base claim, but was indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claim.
- Claim 77 was allowed over the prior art as an independent form of claim 73.

Applicant thanks the Examiner for indicating the allowability of the subject matter of previously presented claim 77. Applicant traverses the rejections of the remaining claims because applicant does not believe that the cited references or any other references teach or suggest a method of separating a target material from a liquid mixture as recited in the rejected claims. Nevertheless, to expedite issuance of a patent,

applicant has amended: (1) dependent claim 75 to provide for proper antecedent basis; (2) independent claim 54 to include the subject matter of claim 70; (3) dependent claims 71, 72, 74 to depend from the proper base claim, and to provide for antecedent basis of all the elements of the claims; and (4) independent claim 77 to correct a misspelled word. Applicant also has cancelled claims 68-70 and 73, without prejudice, to remove redundant subject matter. The new and amended claims focus on a multi-step process of separating a target material from a liquid mixture that applicant believes is clearly distinguishable from the cited references, either alone or in combination. Thus, applicant respectfully requests favorable consideration of the amended claims, and issuance of a Notice of Allowance.

I. Supplemental Information Disclosure Statements

Applicant will be submitting a Supplemental Information Disclosure Statement (IDS) soon to disclose recently uncovered references. Applicant respectfully asks the Examiner to consider this IDS, and the references cited therein, in reviewing this communication.

II. Rejection of Claim 75 under 35 U.S.C. §112, second paragraph

Claim 75 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the Examiner noted that claim 75 previously recited “the coupling agent” which lacked antecedent basis. Applicant has amended claim 75 to replace “coupling group” with “specific binding member,” the antecedent basis of which is found in claim 54. In view of this amendment, applicant

requests that the Examiner withdraw the rejection of claim 75 under 35 U.S.C. § 112, second paragraph.

III. Rejection of Claim 54 under 35 U.S.C. § 103(a)

Claim 54 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Josephson in view of either Bradbury, Kito, or Miltenyi. Applicant traverses this rejection, because applicant does not believe that the cited references or any other references teach or suggest the claimed subject matter. Nevertheless, applicant has amended claim 54 to expedite issuance of a patent.

Claim 54 has been amended to include the subject matter of claim 70, and is drawn to a method of separating a target material from a liquid mixture that includes, among other steps: (1) forming and at least substantially purifying aggregates having a plurality of crystallites of a magnetizable metal oxide; (2) coating the formed and at least substantially purified aggregates with a polysaccharide material to form coated aggregates, *wherein the polysaccharide material includes at least one pendant carboxyl group directly attached to the polysaccharide by a linker having at least one heteroatom for every three carbon atoms in the linker*; and (3) treating the coated aggregates by attaching a specific binding member having a binding affinity for the target material to the polysaccharide material via the carboxyl group to form treated aggregates.

In the Office action, the Examiner rejected the subject matter of claim 70 under 35 U.S.C. § 103(a) as being unpatentable over Josephson and Miltenyi, and further in view of Niswender. The Examiner first correctly noted that “Josephson and Miltenyi fail to teach that the pendant group of the polysaccharide is a carboxyl group attached to the polysaccharide through a linker having at least one heteroatom to every three

carbon atoms in the linker.” (Page 8, paragraph 4 of the Office action dated October 5, 2005). The Examiner then asserted that:

“Niswender teaches a polymeric carrier with a suitable reactive group. The reactive groups are carboxyl, hydroxyl and primary or secondary amine groups. The polymeric material is polysaccharides, dextran. The reactive group can be crosslinked by inclusion of a substantial amount of a polyethylenically unsaturated monomer, such as ethylene glycol dimethacrylate.(see col. 4, lines 5-45).” (Page 9, paragraph 1 of the Office action dated October 5, 2005).

Finally, the Examiner stated that “[i]t would have been obvious to one of ordinary skill in the art to attach carboxyl group to polysaccharide via an ethylene glycol linker as taught by Niswender....”

Niswender discloses water-insoluble polymeric carriers having a reactive group, such as a hydroxyl, carboxyl, or primary or secondary amine. Niswender then provides lists of various polymeric materials that may include specific reactive groups. For example, Niswender discloses “polymeric material containing hydroxyl groups, including cellulose, microcrystalline cellulose, and various water-insoluble derivatives of cellulose; also, crosslinked polyhydroxy compounds such as carbohydrates, sugar alcohols, including dextran, starch, dextrin and other polysaccharides.” (Column 4, lines 9-15). Niswender also discloses “water-insoluble polymers, whether crosslinked or not, of monoethylenically unsaturated molecules such as acrylic and methacrylic acid esters...and other hydroxyl-containing comonomers.” (Column 4, lines 16-29).

Niswender does not disclose attaching a carboxyl group directly to a polysaccharide, as recited in amended claim 54. None of the polysaccharides disclosed in column 4 of Niswender include a carboxyl reactive group. In fact, the only reference in Niswender to water-insoluble carriers having carboxyl groups recites: “[t]he various

monomers mentioned above may be copolymerized with monoethylenically unsaturated acids, such as acrylic acid, methacrylic acid, maleic acid, itaconic acid, to introduce carboxyl groups.” (Column 4, lines 31-35). However, the only monomers mentioned in Niswender are the monoethylenically unsaturated molecules discussed in column 4, lines 17-29. Polysaccharides, such as the hydroxyl and polyhydroxy compounds disclosed in Niswender, are polymers and not monomers. Therefore, Niswender does not teach attaching carboxyl groups onto polysaccharides via a reaction with monoethylenically unsaturated acids.

The Examiner asserted as the basis for rejecting claim 70 that Niswender teaches crosslinking the polymeric material with the polysaccharide by “inclusion of a substantial amount of a polyethylenically unsaturated monomer, such as ethylene glycol dimethacrylate.” The basis for this assertion comes from column 4, lines 39-45, which states that: “[t]he reactive group-containing copolymers may be crosslinked by inclusion of a substantial amount of a polyethylenically unsaturated monomer, such as...ethylene glycol dimethacrylate.” Niswender is very clear that the polyethylenically unsaturated monomer (i.e., ethylene glycol dimethacrylate) is used to crosslink reactive group-containing copolymers. For example, copolymers of methacrylate and methacrylic acid may be crosslinked with other copolymers of methacrylate and methacrylic acid. Presumably, this crosslinking reaction ensures that the polymeric carrier disclosed in Niswender is water-insoluble, so as to provide a solid support for a covalently bound antibody. (See, e.g., column 1, lines 15-43). The crosslinking reaction disclosed in Niswender does not directly attach a carboxyl group to a polysaccharide by any linker, let alone by a linker having at least one heteroatom for

every three carbon atoms (i.e., an ethylene glycol). Because Niswender does not teach or suggest a carboxyl group directly attached to a polysaccharide by a linker having at least one heteroatom for every three carbon atoms, the rejection of claim 54 must be withdrawn.

IV. Rejection of Claims 55-56, 58-72 and 74-76 under 35 U.S.C. § 103(a)

Claims 55-56, 58-69 and 74-76 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Josephson in view of either Bradbury, Kito, or Miltenyi. Claims 70-72 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Josephson in view of Miltenyi and Niswender. Applicant has cancelled claims 68-70 and 73 to remove redundant subject matter. Applicant has amended claims 71, 72, 74 to depend from claim 54. Consequently, claims 55-56, 58-67, 71-72 and 74-76 each depend from claim 54 and are allowable for at least the same reasons as described above for claim 54.

V. Claim 77

The Examiner previously indicated that the subject matter of claim 77 was allowed over the prior art. Claim 77 has been amended merely to correct a misspelled word. The amended claim still recites subject matter previously indicated to be allowable by the Examiner.

VI. Conclusion

In summary, independent claim 54 provides a method for separating a target material from a liquid mixture that is neither taught nor suggested by the art of record. Thus, for at least the reasons indicated above, claim 54 is patentable over Josephson, Bradbury, Kito, Miltenyi, Niswender, and the other references of record, either alone or in combination. Claims 55-56, 58-67, 71-72 and 74-76 all depend from and further limit

claim 54 and so are patentable for at least the reasons that claim 54 is patentable. Claim 77 has been amended merely to correct a misspelled word, and is therefore allowable as previously indicated by the Examiner.

Applicant believes that he has addressed all of the issues raised by the Examiner in the Office action dated October 5, 2005, and that the application currently is in condition for allowance. However, if the Examiner has any questions or comments, or if a telephone interview would advance prosecution of the application, the Examiner is encouraged to call applicant's undersigned attorney at the telephone number listed below.

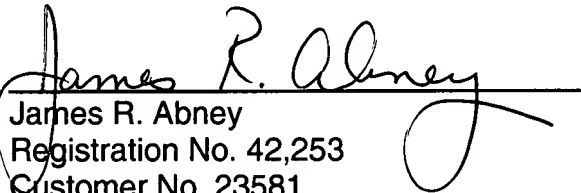
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